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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/811,604	03/29/2004	Pierattilio Di Gregorio	6023-175US (BX2592M)	2819

570 7590 12/12/2007

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ART UNIT	PAPER NUMBER
1791	

MAIL DATE	DELIVERY MODE
12/12/2007	PAPER

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/811,604
Filing Date: March 29, 2004
Appellant(s): GREGORIO, PIERATTILIO DI

William W. Schwarze
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 14 September 2007 appealing from the Office action mailed 13 February 2007.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct. It is noted that the summary is clearly directed to the sole independent claim—Claim 1.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

No evidence is relied upon by the examiner in the rejection of the claims under appeal.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

A. Claims 1-4, 7, 12, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Benson et al (5,107,649) in view of Hunter (5,792,539), Späth (6,189,354) and the applicant's own admission (specification, page 1, paragraph 0005).

With regard to claim 1, Benson et al disclose a known procedure for producing a planar thermo-insulating vacuum panel (evacuating the panel) (column 4, line 40-52) comprising an envelope (having two facing barrier sheets sealed at their edges) (figure 15, number 82) and containing at least one filler selected from the group consisting of inorganic powders (discontinuous filling material) and porous organic foams (porous filling material) (column 16, lines 25-29). Benson et al further disclose that the panel can be curved into a cylinder (column 9, lines 22-26 and Figure 18).

Benson et al disclose using at least one filler selected from the group consisting of inorganic powders and porous organic foams (column 16, lines 25-29), but do not expressly disclose that the powders and foams are included inside the vacuum envelope. Hunter teaches a bendable vacuum panel (evacuating the panel) (column 8, lines 57-67), which contains at least one filler selected from the group consisting of inorganic powders and porous organic foams (column 9, lines 21-29). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include a powder or foam as taught by Hunter in the panel taught by Benson et al. The motivation to do so would have been to increase the R-value. The R-value would be increased by the including of powder or foam because foam has multiple gas pockets

trapping air, and Hunter recognized that stationary air inhibits heat transfer in (see col. 6, lines 40-43). Thus, the filling material would fill the envelope formed by the facing sheets, and as the filling material is between the sheets, it would space the facing sheets at least to the extent that the sheets were separated.

Benson et al do not disclose the method by which the panel is curved, but do disclose that the panel may comprise metal sheets, (see column 4, line 8-17) and that the sheets may be bent (column 6, lines 48-54). Attention is drawn to Späth, which discloses a method for curving hollow metal sheets (column 1, lines 6-8) through calendaring by using two rollers and a third element (a roller) of equal length placed parallel to the two rollers, (see Figure 1). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to curve the panels taught by Benson et al using the method taught by Späth. The motivation to do so would have been to produce a curved hollow metal sheet so that the hollow section is protected against bulges, nicks or against any other kind of deformation (Späth, column 1, lines 15-18).

Benson et al do not expressly disclose that the vacuum panel comprises at least one metal sheet having a thickness not greater than 100 μm. Applicant's admission discloses that envelopes made of barrier sheets of thickness generally not greater than 100 μm are known in the art (specification, page 1, paragraph [0005]). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to assemble and curve a vacuum panel as taught by Benson et al in view of Späth et al having a barrier sheet of less than 100 μm thickness. The motivation to do so would

have been to create a high-performance insulation material occupying less volume that is therefore more valuable (Benson et al, column 12, lines 12-14).

With regard to claim 2, Späth teaches the calendaring operation is carried out by passing the planar vacuum panel between at least two rollers and a third element of length equal at least to a length of the two rollers and having a position parallel to the two rollers (Figure 1, number 27).

With regard to claim 3, Späth teaches the third element is a third roller (Figure 1, number 27).

With regard to claim 4, Benson et al teach the thickness of the vacuum panel may be 2.5 mm thick (column 11, lines 49-55), which is less than the claimed 20 mm. Hunter teaches that the filling material may be rigid polyurethane foam (column 9, line 24),

With regard to claim 7, Späth also discloses a method for curving metal panels through calendaring by using two rollers and a third element of equal length placed parallel to the two rollers where the position of the third element (a roller) is continuously modified during the calendaring operation, (column 8, lines 62-67).

With regard to claim 12, Benson et al teach that the vacuum panel contains at least one getter material (column 4, lines 51-52).

With regard to claim 13, the applicant's specification teaches that it is known to produce a vacuum panel using a multilayer barrier sheet having at least one metal layer (specification, paragraph 0005). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to form the vacuum panel taught by

Benson et al using a barrier sheet which is a multilayer sheet having at least one metal layer. The motivation to do so would have been to confer a barrier effect and mechanical support and protection of the barrier layer (specification, paragraph 0005).

B. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Benson et al (5,107,649) in view of Hunter (5,792,539), Späth (6,189,354), the applicant's own admission (specification, page 1, paragraph 0005) and Nishimoto (6,336,693).

With regard to claim 5, the teachings of Benson et al in view of Hunter, Späth, and the applicant's own admission teach the invention of claim 4 as discussed above but do not expressly teach the vacuum panel is between 5 and 20 mm. Nishimoto discloses that it is known to construct vacuum panels using hard polyurethane foam having a thickness in a range of 10 to 20 mm (see column 3, lines 47-58). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to increase the thickness of the panel taught by Benson et al in view of Hunter, Späth, and the applicant's own admission to between 5 and 20 mm as taught by Nishimoto. The motivation to do so would have been to increase the insulating properties of the panel.

With regard to claim 6, Benson et al in view of Hunter, Späth, and the applicant's own admission teach the invention of claim 1 as discussed above and that the filler may be silica powder (column 9, lines 26-28) but do not expressly teach the vacuum panel is between 5 and 20 mm. Nishimoto discloses that it is known to construct vacuum panels having a thickness in a range of 10 to 20 mm (see column 3, lines 47-58). At the time of

the invention, it would have been obvious to a person of ordinary skill in the art to increase the thickness of the panel taught by Benson et al in view of Hunter, Späth, and the applicant's own admission to between 5 and 20 mm as taught by Nishimoto. The motivation to do so would have been to increase the insulating properties of the panel.

C. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Benson et al (5,107,649) in view of Hunter (5,792,539), Späth (6,189,354), the applicant's own admission (specification, page 1, paragraph 0005), and Haase (4,011,357).

With regard to claim 8, Benson et al in view of Hunter, Späth, and the applicant's own admission teach the invention of claim 1 as discussed above. Furthermore, Benson et al also teach that spacer beads coated with a polystyrene or similar adhesive material are to be affixed to the wall sheets of the planar vacuum panel, (column 7, lines 9-14), thus necessarily creating at least a layer of polymeric adhesive on at least one face of the panel. Benson teaches that the panel is subsequently bent, (column 7, lines 2-8). Benson et al does not expressly teach that the polystyrene layer is in a foam state. Haase discloses that polystyrene can be foamed (column 2, lines 47-56). Therefore, it can be reasoned that foamed polystyrene would be a similar adhesive material to polystyrene as disclosed by Benson. Furthermore, Benson recognizes that polystyrene has desirable insulating properties (column 7, lines 34-40) and the use of foamed polystyrene as adhesive would enhance the insulating properties of the vacuum panel as a whole. Therefore, it would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made to have placed adhesive polymeric

foam on at least one face of a vacuum panel and to have curved the panel through calendaring for the reasons discussed above.

(10) Response to Argument

It is noted that the first ground of rejection A is argued in appellant's arguments sections VII D and E. The second ground of rejection B is argued in appellant's arguments sections VII F1 and F2. The third ground of rejection C is argued in appellant's arguments sections VII F3 and F4.

In appellant's arguments section VII D and E, Appellant discusses the first ground of rejection's reliance of incorporating inorganic powder into Benson's envelopes that contain small sphere glass or ceramic beads (see Benson, col. 16, lines 25-29 and col. 4, lines 8-17) in view of the additional references relied upon. It is noted that such glass or ceramic beads as disclosed as being in Benson's envelopes could be the "inorganic powder" filling material as required by Claim 1:

In appellant's arguments section VII E, Appellant argues that incorporating fillers into Benson's vacuum envelope would destroy the resistance to heat transfer and preclude the formation of a leak-free weld. In response, the Examiner submits that as claimed, Hunter judges foam to be sufficient to use in vacuum panels (see col. 9, lines 21-29), and such foam meets Claim 1's filling material limitation. Since the material is a foam and not a powder or fiber at the time of sealing, there is now powder or fiber to interrupt the seal. Thus, concerns of Benson (see col. 3, lines 6-10) or concerns

expressed in the Declaration of Paolo Manini (page 3, paragraph numbered 8) regarding the effects of powder or fiber caught in the seal are moot. Regardless, even if long-term seal integrity were compromised, a vacuum panel would be sufficient for use even if only usable for several years before seal degradation. It is also noted that Applicant's admitted prior art discloses that it is well know to have foam and powder within vacuum panels (see Applicant's Specification, paragraphs [0005] and [0006]).

In appellant's arguments section VII E, Appellant argues that it is incorrect to decrease the thickness of the barrier sheet to 100 μm to create a high-performance insulation material occupying less volume that is therefore more valuable (Benson et al, column 12, lines 12-14) because the space savings is minimal and the structural strength is compromised. In response, the Examiner relies upon Benson's teaching of appropriate thickness. Benson does not require at least 200 μm thickness since Benson teaches that the minimum is optional—"for purposes of illustration" and "can be" (see col. 11, lines 49-55). Discussion of structural compromise to the point of failure at barrier sheet thicknesses of 100 μm is unsupported by facts of record. Moreover, it is also noted that Applicant's admitted prior art includes 100 μm barrier sheets (see Applicant's Specification, paragraphs [0005]).

In appellant's arguments section VII E, Appellant argues that Späth's teachings are only applicable to metal tubes, that the large forces of Späth's examples (see col. 6, lines 36-39) would necessarily be used in any application of Späth's teachings, and that

such forces would destroy vacuum panels. In response, the Examiner relies on Benson's teaching of bending vacuum panels in curves (see col. 6, lines 48-54), which is inclusive of calendaring. In looking to practice Benson's teaching of bending in curves, one would look to Späth's teachings of calendaring so that the hollow section is protected against bulges, nicks or against any other kind of deformation (Späth, column 1, lines 15-18). Moreover, one of ordinary skill in the art at the time the invention was made would have viewed Späth's forces in view of Späth's teachings of protecting the article to be worked and thus would have employed smaller rollers or smaller forces for smaller or more easily bendable objects.

In appellant's arguments section VII F1 and 2, Appellant argues that increasing the thickness of the panels as taught by Nishimoto would be contrary to previously relied upon motivation of thinning the barrier layers. In response, the Examiner notes that the interior may be made thicker while minimizing the barrier layer thickness. Moreover, the Examiner notes that both motivations—increasing the interior thickness of the panels and decreasing barrier layer thickness—optimize parts for the overall system and minimize conduction of heat.

In appellant's arguments section VII F3 and 4, Appellant argues that, absent Haase, no teaching and no motivation is provided for calendering a panel with an adhesive layer of polymeric foam is provided. In response, the Examiner relies on Benson's teaching of a polystyrene adhesive layer being present (see col. 7, lines 2-8)

with desirable insulating properties (see col. 7, lines 34-40), which would be accomplished by Haase's teachings of foaming polystyrene (see col. 2, lines 47-56).

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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